UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/661,757	09/12/2003	Christopher K. Davey	81091093	8156

36865 7590 09/04/2007

ALLEMAN HALL MCCOY RUSSELL & TUTTLE, LLP
806 S.W. BROADWAY, SUITE 600
PORTLAND, OR 97205

EXAMINER	
OLSEN, KAJ K	

ART UNIT	PAPER NUMBER
1753	

MAIL DATE	DELIVERY MODE
09/04/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/661,757	DAVEY ET AL.	
	Examiner	Art Unit	
	Kaj K. Olsen	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8 and 12-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8 and 12-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1, 3, 6, 8, and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimasaki et al (USP 5,740,675) in view of Seidenfuss (USP 5,929,328). Seidenfuss is being cited and relied on for the first time with this office action. Its use here was necessitated by the applicant's amendments to the claims.

3. Shimasaki discloses a system and method for determining a temperature of exhaust gas from an engine comprising an exhaust gas sensor 52 having an electric heating coil where said sensor communicates with exhaust gas, an electrical circuit for generating a signal indicative of the resistances of said heating coil when said coil is not de-energized, and a controller receiving said signal and calculating said temperature of said exhaust gas based on said signal. See fig. 1, abstract, and col. 5, l. 66 through col. 6, l. 40. See also fig. 12 and 13 and col. 7, l. 39 through col. 8, l. 7 for an embodiment where an infinitesimal current is utilized (i.e. the heater is de-energized). Shimasaki further discloses that the controller generates a duty cycle to successively energize and de-energize said coil. See col. 5, ll. 8-18. However, Shimasaki does not explicitly disclose that the controller calculates the temperature during a plurality of successive de-energized periods of the duty. Rather Shimasaki in the embodiment of fig. 13 utilizes switches separate from the duty cycle to affect temperature measurement. However, Seidenfuss teaches in an alternate temperature sensing means for an exhaust gas heater that the temperature

measurement can be interfaced with any duty cycle for the heater. In particular, Seidenfuss utilizes a single switch T1 that can both de-energize the heater and allow for the measurement of a current I_M analogous to the infinitesimal current of Shimasaki. See fig. 1 and 2 and col. 2, l. 55 through col. 3, l. 18. This is in contrast to Shimasaki, which requires three switches, two (62, 66) for the measurement of the infinitesimal current and one (Tr) for control of the duty cycle. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Seidenfuss for the system and method of Shimasaki because the teaching of Seidenfuss required fewer switches, thereby simplifying circuit construction.

4. Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize a measurement coordinated with the heater duty cycle, like that taught by Seidenfuss, for the system or method of Shimasaki for the added benefit that the duty cycle of the heater not be altered by the temperature measurement. In particular, Shimasaki presumably has set the duty cycle for the heater to a particular level that provides a desired temperature control. However, if any temperature measurement of Shimasaki would happen to occur during a time when the heater is supposed to be on (i.e. the ECU has turned switch Tr on), then the temperature measurement of Shimasaki would alter the effective duty cycle for the heater because the measurement means would have de-energized the heater irrespective of the duty cycle set for switch Tr. Utilizing Seidenfuss, which only measures a temperature when the heater was supposed to be off anyway would thereby prevent an altering of the effective heater duty cycle. With respect to the measurement occurring in a plurality of successive de-energized periods, one possessing ordinary skill in the art would recognize that more successive temperature measurements would provide more temperature measurements for the ECU. See the

flowchart of fig. 5 of Shimasaki, which includes a temperature measurement in S102 that would presumably be repeated until NE, Tcat, TA, and TW are all affirmative. See Seidenfuss, col. 2, ll. 1-15 where the temperature measurement is utilized for regulation, which would inherently require successive temperature measurements.

5. With respect to determining the oxygen content as well, the oxygen sensor is clearly also being utilized to determine the oxygen content of the exhaust gas as well. See the abstract. Furthermore, the temperature is being determined just after engine ignition and before the engine has warmed up (i.e. prior to the coolant temperature reaching a predetermined value). See Shimasaki, fig. 2 and col. 5, l. 48 through col. 6, l. 16.

6. With respect to comparing a first exhaust gas temperature to a second exhaust gas temperature, Shimasaki shows in fig. 4 shows a comparison between different resistance values at different exhaust gas temperatures. This would read on the broadly defined comparing of a first exhaust temperature with a second exhaust temperature.

7. With respect to an additional oxygen sensor upstream from the catalyst, Shimasaki disclose an oxygen sensor 50 upstream from the catalysts (20, 22) with oxygen sensor 52 being downstream from these catalysts. See fig. 1 and col. 4, ll. 19-35.

8. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimasaki in view of Seidenfuss as applied to claim 1 above, and in further view of Takeuchi et al (USP 4524,264).

9. Shimasaki and Seidenfuss disclose all the limitations of the claims, but did not explicitly recite the use of a Wheatstone bridge circuit operably coupled to the gas sensor. Takeuchi teaches that the heater of a gas sensor can be placed within a Wheatstone bridge to regulate the power supplied to the heater such that a constant temperature for the heater is established. See

fig. 4 and col. 6, ll. 48-68. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Takeuchi for the system of Shimasaki and Seidenfuss so as to provide a well-regulated and consistent temperature.

10. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jelden et al (USP 5,592,815) in view of Shimasaki and Seidenfuss.

11. Jelden discloses a system for determining a temperature difference of exhaust gas comprising a first temperature sensor 4 communicating with exhaust gas upstream of the catalyst 3 generating a first temperature signal, a second temperature sensor 5 communicating with exhaust gas downstream of the catalyst generating a second temperature signal, and a controller calculating a temperature difference between exhaust gas communicating with said first and second temperature sensors based on the first and second signals. See fig. 1 and col. 4, ll. 10-58. Jelden does not explicitly disclose the use of first and second exhaust gas sensors for the generation of the temperature signals, particularly the use of the heating coil of an exhaust gas sensor. Shimasaki discloses that a separate temperature sensor for monitoring temperature is not necessary because one can rely on a measurement of the heater coil resistance from an oxygen sensor, which Shimasaki teaches that most internal combustion engines are already equipped with anyway. See the abstract, col. 1, ll. 23-56, and col. 5, l. 66 through col. 6, l. 40. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Shimasaki for the system of Jelden so as to provide simultaneous oxygen and temperature sensing without requiring separate temperature and oxygen sensors.

12. With respect to the new limitations requiring the controller to calculate the temperatures during a plurality of respective successive de-energized periods, the examiner addressed in the

rejection above why Seidenfuss renders obvious the use of a temperature measurement means that provides for the temperature measurement only during de-energized portions of the duty cycle. See the discussion above. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Seidenfuss for the system of Jelden and Shimasaki so that the temperature measurement requires fewer switches and doesn't interrupt the normal duty cycle for the sensor heater. Furthermore, because Jelden is relying on essentially continuous temperature measurements (see fig. 2), one would have been motivated to provide the temperature measurements of Shimasaki in view of Seidenfuss during successive de-energized periods so that the temperature can be repeatedly rechecked.

13. With respect to the new limitation of claim 5 requiring an electric circuit coupled to both the first and second electric heating coils, both of the circuits of Shimasaki and Seidenfuss rely on a connection to both the car battery and ground. See fig. 13 of Shimasaki and fig. 1 and 2 of Seidenfuss. Hence even if different circuit portions are utilized for the determination of the temperature of both the first and second heating coil, because these circuit portions both contain the common elements of the battery and ground and these two circuit portions would read on the specified electrical circuit coupled to both the first and second heating coils.

Response to Arguments

14. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection relying on the further teaching of Seidenfuss.

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (571) 272-1344. The examiner can normally be reached on Monday through Friday from 8:00 A.M. to 4:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AU 1753
August 30, 2007

KAJ K. OLSEN
PRIMARY EXAMINER